Adolescent Immunization in Developing Countries: Obstacles and Opportunities

Hartono Gunardi

Department of Child Health
Faculty of Medicine University of Indonesia

2018 Global Vaccine and Immunization Research Forum, 20-22 March, Bangkok, Thailand
| Outline |

✓ Adolescent immunization schedules in developing countries

✓ Obstacles related to optimal implementation of vaccines

✓ Identify opportunities to address these obstacles
## WHO recommendations for routine immunization

<table>
<thead>
<tr>
<th></th>
<th>Adolescents</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B</td>
<td>3 doses (catch up)</td>
<td></td>
</tr>
<tr>
<td>Td</td>
<td>1 boost 9-15yrs</td>
<td></td>
</tr>
<tr>
<td>Rubella</td>
<td>1 dose (catch up)</td>
<td>1 dose (catch up)</td>
</tr>
<tr>
<td>HPV</td>
<td>2 doses (F)</td>
<td>3 doses (catch up)</td>
</tr>
</tbody>
</table>

### Certain Regions

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tick-borne</td>
<td>3 doses + boost</td>
</tr>
<tr>
<td>Encephalitis</td>
<td></td>
</tr>
</tbody>
</table>
WHO recommendations for routine immunization

<table>
<thead>
<tr>
<th></th>
<th>Adolescents</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>High-risk populations</strong></td>
<td></td>
</tr>
<tr>
<td>Typhoid</td>
<td>Vi Ps 1 dose/ Ty21a 3-4 doses +boost</td>
<td></td>
</tr>
<tr>
<td>Cholera</td>
<td>WC-rBS 2 doses +X 2 doses + boost / Shanchol &amp; mORVAX : 2 doses + boost</td>
<td></td>
</tr>
<tr>
<td>Mening C conj</td>
<td>2 doses + boost (catch up)</td>
<td></td>
</tr>
<tr>
<td>Mening Quadri conj</td>
<td>1 dose (catch up)</td>
<td></td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>at least 1 dose</td>
<td></td>
</tr>
<tr>
<td>Rabies</td>
<td>3 doses</td>
<td></td>
</tr>
<tr>
<td>Dengue (CYD-TDV)</td>
<td>3 doses 9-45 yrs</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Others IP with certain characteristics</strong></td>
<td></td>
</tr>
<tr>
<td>Seasonal Influenzae</td>
<td>1 dose</td>
<td></td>
</tr>
<tr>
<td>varicella</td>
<td>2 doses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Priority for pregnant women</td>
<td></td>
</tr>
</tbody>
</table>
Obstacles of implementation

Population level

Practice level

Patient level

Berenstein HH. Pediatrics 2017;139(3):e20164186
Obstacles of implementation

Population level

- Social marketing
- Web-based education
- Antivax & Halal issues

Berenstein HH. Pediatrics 2017;139(3):e20164186
Population level: obstacles & opportunity

- **Social marketing**
  - TV, Radio, Newspapers, Social media: benefits & safety
  - Ministry of Health & Professional org

- **Web-based education**
  - Created by MoH or professional organization or NGOs

- **Antivax**
  - Ministry of Health (HPV)
  - Religious Council
  - Professional organization

Opportunities to overcome antivax

1. **Should we do battle with antivaccination activists?**
   Antivaccination groups persist and attempts to silence them may amplify exposure to their messages.

2. **What is the best focus of vaccine advocacy?**
   Best focus should be on addressing the causes of low coverage:
   
   a. who lack opportunity to vaccinate
   b. who lack acceptance of vaccination

Obstacles of implementation

Population level

Practice level

Social marketing (benefit & safety)
Web-based education
Antivax & Halal issues

Berenstein HH. Pediatrics 2017;139(3):e20164186
Obstacles & opportunity at practice level

School base
- Missed immunization
- Less interested

Health facility based
- Limited working hour
- Cost efficient
- Vaccine is not available in hospital

Opportunity in School based delivery

• Delivery platform for vaccinating large numbers of adolescents

• May not be successful due to suboptimal school attendance rates → geographical location, socio-economic status and gender

• Ideally offer second opportunity for missed immunization

Coverage achievements across delivery experiences of HPV vaccination in 45 LMIC

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Final dose coverage² (number (%))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≥90%</td>
</tr>
<tr>
<td>School only</td>
<td>8 (40)</td>
</tr>
<tr>
<td>Health facility (+/- outreach)</td>
<td>2 (40)</td>
</tr>
<tr>
<td>School + health facility (+/- outreach)</td>
<td>15 (43)</td>
</tr>
<tr>
<td>All experiences</td>
<td>25 (42)</td>
</tr>
</tbody>
</table>

Coverage of a 2 or 3 dose regimen (only 10 experiences had coverage data on 2-dose regimen)

<table>
<thead>
<tr>
<th>Intervention category</th>
<th>Possible complimentary intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screening</td>
<td>Vision screening (if referral/glasses available &amp; affordable) / psychosocial screening</td>
</tr>
<tr>
<td>Provision of information</td>
<td>Reproductive and sexual health education; HIV prevention, Life skill</td>
</tr>
<tr>
<td>Commodity delivery</td>
<td>Anti-helminthic treatment / Insecticide treated bed nets for malaria prevention / Iron and folic acid supplementation</td>
</tr>
</tbody>
</table>

Opportunity in Health based delivery

• **Immunization service closes before school dismissed**
  Extending working hour for immunization services

• **Cost-effectiveness vs coverage**
  Minimum number of threshold for multidose vial vaccine should be omitted

• **Vaccine is not available/not covered by insurance in hospitals**
  Changes in health care (Immunization) policy
Outreach Programmes

Mobile unit

- To reach out-of-school adolescents
- Geographical obstacles

Vaccine availability

- Lowering number of adolescent per vaccine vial
Out-of-school children and adolescent globally

Important to reduce immunization inequality

Opportunity to immunize out-of-school adolescents

(1) Identify and quantify out-of-school adolescents eligible for vaccination,

(2) Understand barriers to vaccine access and acceptance,

(3) Communicate effectively with communities and eligible adolescent about vaccine,

(4) Increase vaccine access by creating opportunities for follow-up, outreach, and integrated health services.

Obstacles of implementation

Population level
- Social marketing (Benefit & safety)
- Web-based education
- Antivax & Halal issues

Practice level
- Enhance access
- School based immunization
- Health facility based

Patient level

Berenstein HH. Pediatrics 2017;139(3):e20164186
Patient level

Vaccine hesitancy
- Education by professional organization/healthcare provider/religious leader

Reminders
- Text message
- Postcard
- Email
- Phone call

The interventions with largest observed increases (>25%) in vaccine uptake:

1) aimed to increase vaccination knowledge and awareness
2) engaged religious or other influential leaders to promote vaccination
3) improved convenience and access to vaccination
4) directly targeted unvaccinated or under-vaccinated populations
5) mandated vaccinations or sanction against non-vaccination

Opportunity to overcome vaccine hesitancy (2)

Dialogue-based interventions

- Involvement of religious or traditional leaders in low baseline uptake indicated a large, positive effect (RR 4.12 [3.99, 4.26])

- Social media interventions found a positive effect on uptake for MCV4/Tdap (RR 2.01 [1.39, 2.93])

## Vaccination reminders

### Impact of strategies on vaccination coverage

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>log[Risk Ratio]</th>
<th>SE</th>
<th>Weight</th>
<th>Risk Ratio IV, Random, 95% CI</th>
<th>Risk Ratio IV, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kempe 2012</td>
<td>0.4957</td>
<td>0.0954</td>
<td>7.7%</td>
<td>1.64 [1.36, 1.98]</td>
<td></td>
</tr>
<tr>
<td>Stockwell 2012</td>
<td>0.7005</td>
<td>0.1904</td>
<td>6.6%</td>
<td>2.01 [1.39, 2.93]</td>
<td></td>
</tr>
<tr>
<td>Suh 2012</td>
<td>0.3631</td>
<td>0.077</td>
<td>7.8%</td>
<td>1.44 [1.24, 1.67]</td>
<td></td>
</tr>
<tr>
<td>Szilaagyi 2013</td>
<td>0.3511</td>
<td>0.1064</td>
<td>7.6%</td>
<td>1.42 [1.15, 1.75]</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td><strong>29.6%</strong></td>
<td></td>
<td></td>
<td><strong>1.53 [1.37, 1.72]</strong></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: Tau^2 = 0.00; Chi^2 = 3.77, df = 3 (P = 0.29); I^2 = 20%
Test for overall effect: Z = 7.33 (P < 0.00001)

Heterogeneity: Tau^2 = 0.19; Chi^2 = 527.86, df = 6 (P < 0.00001); I^2 = 99%
Test for overall effect: Z = 3.90 (P < 0.00001)

Diphtheria Outbreak in Indonesia 2017

Pockets of unimmunized individuals due to antivax &/ vaccine hesitancy

2017: diphtheria cases 954 → adolescent cases 239 (25%)
Outbreak Response Immunization was carried out in 14 provinces.
Wae Rebo: UNESCO Asia-Pacific Heritage Award 2012 winner
Summary

High adolescent immunization coverage may be achieved by taking the opportunities to overcome obstacles in:

a. Population level by social marketing through collaboration with religious/community leader/all stakeholders to increase knowledge and awareness to reduce vaccine hesitancy and antivax

b. Practice level by school-based, hospital-based and outreach program to reach optimal coverage

c. Patient level by establishing rapport and trust, improving access and setting of reminder.
Acknowledgements

• Peter Dull, MD
• B Fenton Hall, MD, PhD
• Martin Friede, MD, PhD
• Philipp Lambach, MD
• Kathleen M. Neuzil, MD, MPH, FSIDA
• Susan A Wang, MD, MPH
• Nihal Abesysinghe, MBBS, MSc, MD
• Odile Leroy, MD, MPH

Thank you